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SCIENCE NEWS LETTER

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THE WEEKLY SUMMARY OF CURRENT SCIENCE

MAY 18, 1935

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The Weekly Summary of Current Science

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SCIENCE SERVICE

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Edited by WATSON DAVIS

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DO YOU KNOW?

Bees flourish notably in dry regions of the world, observes one entomologist.

Recent records in Montana show that when the air temperature was 19 below zero the soil surface under a four-inch snow blanket was almost 18 degrees above zero.

Rubber growers advocate many uses of rubber on farms, from rubber stalls and floorings in cow sheds to rubber rims that make churns less noisy.

The camel's extraordinary ability to get along without water is believed due to cells for storing water in its stomach, and to the fat-storing hump, a potential source of much metabolic water.

A University of California psychologist finds that children and older people attending moving picture shows are not passive and mentally dormant, but do remember a surprising amount of information later—hence the movies are not mere places of entertainment, but play a big role in teaching.

About seven persons out of 100 show a natural immunity to dental decay.

In 1800, a Frenchman conceived the idea of making an endless web of paper by introducing a water suspension of pulp on to an endless moving belt of wire.

Fires set by incendiaries in national forests have been reduced nearly 50 per cent. since the organization of the Civilian Conservation Corps.

The Hadassah Medical Organization has reduced the eye disease trachoma among children attending Jewish schools in Palestine from 34 to 6.3 per cent. in 17 years.

California recently experienced a cobra scare, when a snake carcass aroused fear that India's deadly snake had been introduced; however, the zoological verdict was that a fish head lodged in the neck caused the dilated cobra-like look, and the specimen was a harmless garter snake.

WITH THE SCIENCES THIS WEEK

Most articles are based on communications to Science Service or papers before meetings, but where published sources are used they are referred to in the articles.

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What effect has poverty on the birth rate? p. 325.

MEDICINE

Multiple Sclerosis Laid To Blood That Clots Too Easily

Reverse of Bleeders' Disease Caused by Too Much Fibrin Results in Clots in Small Veins of the Brain

BLOOD that clots too easily, a condition quite the reverse of hemophilia, the bleeding condition made famous because it afflicts members of European royalty, was put forward as the fundamental cause of the hopeless nerve disease, multiple sclerosis.

Experiments indicating this blood abnormality plus such outside influences as injury or infection cause the mysterious nerve disease were reported by Drs. Philip Solomon, Mary E. Dailey and Tracy J. Putnam of Harvard Medical School and Boston City Hospital at the meeting in Atlantic City, N. J., of the American Society for Clinical Investigation.

Pinning the disease onto a blood condition gives an entirely new and possibly more hopeful approach to the attack on the disease, since medical scientists have till now concentrated their efforts on finding an infection or poison which might be the cause of the malady.

Increasingly Common

Multiple sclerosis, once considered a rarity in America, is today becoming increasingly common, according to medical authorities. A patient rarely dies of the disease but he may be virtually helpless over a long period of years. Its most marked symptom is a progressive inability to walk. It is characterized by episodes of weakness from each of which a marked recovery is made, although the patient is left slightly weaker each time until paralyzed. Hardening of disk-like patches on the nerves gives the disease its name, multiple sclerosis, which translates into "many hardenings."

The discovery that a blood condition is at the base of this nerve disease rests on recent research of Dr. Putnam's. He found evidence that the disease is due to many blood clots forming in the small veins of the brain and spinal cord and obstructing these blood vessels.

Following this lead, Dr. Putnam's colleagues investigated the blood of multiple sclerosis patients to find whether it clotted more easily than blood of healthy persons.

A large proportion of the patients, they found, had more fibrin in their blood than normal persons. Fibrin is the essential portion of blood clots. The blood of multiple sclerosis patients does not ordinarily clot any more rapidly than that of normal persons. Its clotting, however, is greatly increased when the patients are given adrenalin or typhoid vaccine.

Explains Onset

This explains for the first time, Dr. Solomon pointed out, the well-known fact that the onset or increases in severity of multiple sclerosis are often associated with injury, operation, exposure, infection, immersion, pregnancy or severe emotional excitement.

Any of these factors, but probably chiefly infections and injuries, occurring to persons whose blood clots more easily than normal, probably cause the numerous blood clots in veins of brain and spinal cord which, in turn, bring on the disease.

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MEDICINE

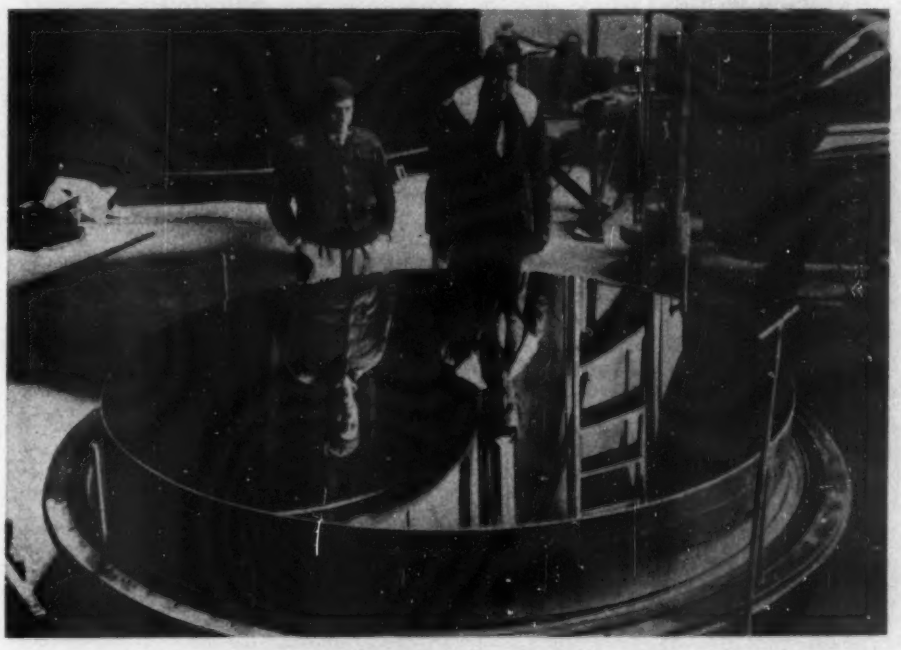
Convulsions in Childbirth Laid to Lack of Protein

FAULTY diet was blamed for many of the cases of convulsions in mothers at childbirth in a report by Dr. Maurice B. Strauss of Thorndike Memorial Laboratory, Boston City Hospital, at the meeting of the American Society for Clinical Investigation.

These convulsions are characteristic of a group of diseases known as toxemias, which accounts for one-fourth of all maternal mortality, Dr. Strauss explained.

Feeding a diet containing a large proportion of protein foods in the early stages of this disorder, together with the injections of certain extracts, caused all symptoms to subside in the patients studied, Dr. Strauss reported.

"If the expectant mother does not eat enough protein food—meat, fish, eggs and milk—instead of losing weight she gains weight excessively, but this weight



GOOD JOB WELL DONE

Drs. John Strong and Enrique Gaviola of Califorina Institute of Technology inspect the gleaming surface of the great 100-inch mirror of the famous Mt. Wilson Observatory telescope, just coated with aluminum instead of the customary silver. Dr. Gaviola, professor from Buenos Aires on leave in this country on a Guggenheim exchange fellowship, assisted Dr. Strong in applying the aluminum by the latter's evaporation technique. Also assisting in the gigantic operation, which increases the light-gathering power of the telescope, were Milton L. Humason and Ferdinand Ellerman of the Observatory staff.

consists of water or 'occult dropsy'," Dr. Strauss said in reporting his latest studies on the condition.

In many cases this condition leads to what physicians term eclampsia, with convulsions and coma, or complete loss of consciousness, which frequently results in the death of both mother and child.

Studies which he began five years ago suggested that many of the toxemias which take such a toll of mothers and infants are the result of diets lacking proper nutritive qualities. For example, if the expectant mother does not receive enough iron in her diet, one type of anemia results. If she eats food low in the vitamin B complex, she may get a form of nerve paralysis or a primary type anemia. The importance of protein in the the expectant mother's diet is the latest discovery Dr. Strauss has made in the course of these studies.

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ARCHAEOLOGY

Writing by Babylonian Wife Tells of Buying Second Wife

LETTERS written by women of old Babylonia are harder to decipher than the writings of male correspondents, but more interesting to read.

Thus is letter writing of 4,000 years ago summed up by John B. Alexander, graduate student of Yale, who has deciphered love letters, royal messages, and business documents in the Yale Babylonian Collection.

The surprising discovery of a Babylonian wife purchasing a second wife for her husband was mentioned by Mr. Alexander as he reported his researches before the Semitic and Biblical Club at Yale.

Describing this strange business transaction, Mr. Alexander said:

"The record of the purchase of a second wife is in the form of an adoption, the first wife adopting the second wife as her sister and giving her to her husband as a wife.

"The possibility that all might not go smoothly is provided against in the stipulation that if the husband should decide to divorce his first wife, she shall take away with her all the property of the second wife. But if the first wife becomes jealous and wishes to leave her husband, she shall have nothing!"

The picture of women attempting to get money from men is as old as Babylonia, as shown in a letter described by Mr. Alexander:

"Tarish-matum writes to Kubutum begging him to send her a shekel of silver. She has written ten times and he hasn't answered her. She hasn't a single measure of meal. In the name of Pa-bil-sag, would he send her one shekel. A second part is appended to the letter, addressed to another man, asking him in honeyed words to use his influence and see that Kubutum sends her the money."

This shows that people in Babylonia sometimes could not read and had to have their letters read to them, for the second part of this letter was not intended for the eyes of the tight-fisted Kubutum.

Another ancient "gold-digger" resorted to poetry, calling the man addressed "her cedar in whose shadow she finds shelter." The home of her fathers, she explained, would have to be sold. But all she asks is enough to bury her. The reply to this eloquent appeal has not been found.

Science News Letter, May 18, 1935

PHARMACOLOGY

Pharmacist Given Highest Professional Award

THE Remington Honor Medal, highest award in pharmacy, was awarded for 1935 to Samuel Louis Hilton, retail pharmacist of Washington. Dr. Hilton receives this award for his many years of service to his profession and particularly for his efforts in connection with the building of the American Institute of Pharmacy which was completed this year.

Dr. Hilton is a native of Washington and has conducted a retail pharmacy here for 46 years in addition to giving much time to activities of pharmaceutical associations. All the medicine given to the late William Howard Taft, former President and Chief Justice, was prepared by Dr. Hilton.

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ORNITHOLOGY

Voices of Southern Birds Recorded For Movie Films

WANTED: the sweetest-voiced mockingbird in the South.

This is not the announcement of a radio audition for budding opera stars down in Dixie, but part of a sober scientific program being carried on by the Cornell University-American Museum Ornithological Expedition, now in the field in the Gulf Coast region. The scientists in charge have already succeeded in recording the voices of several mockingbirds, and when they played them again, in a Georgia garden, they drove all the other mockingbirds in the neighborhood crazy. They flew frantically about, and even peered into the apparatus, seeking the singer.

The expedition is travelling in a truck specially equipped for taking motion pictures and song records of birds. It even has a light tower which can be run up quickly on top, to get the observers and records into the birds' treetop homes. This set-up has caused a good deal of excited interest among the people of the countryside as well as among the birds.

Already, reports Dr. A. A. Allen of Cornell University, leader of the expedition, a considerable number of birds have been placed on record. These include wild turkey, bald eagle, fish hawk, wood ibis, egret, pelican, cormorants and various species of gulls and other shore birds. Less familiar species which have also been filmed and recorded are limpkin, anhinga, Audubon's caracara and the exceedingly rare sandhill crane.

One of the main objectives of the expedition has been to find the ivory-billed woodpecker, which is now very near extinction. Ten years ago, after it was thought to be extinct, Dr. Allen rediscovered a few last individuals in a remote cypress swamp of central Florida, and he recently completed a search in the same region for a final remnant of this beautiful bird, but as yet without success. At present the expedition is in Louisiana, where a few ivory-bills still remain, and Dr. George Sutton, the artist of the expedition, making studies from life of the ivory-bill and other rare species.

The expedition is a joint enterprise of Cornell University and the American Museum and is being financed by A. B. Brand of the Museum, who is also an associate in ornithology at Cornell University.

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MEDICINE

Vitamin C Not A Preventive Or Cure of Rheumatic Fever

Tests on Over One Hundred Persons Demonstrate That Ascorbic Acid Prevents Scurvy But Not Rheumatic Ill

DESPITE recent animal experiments suggesting that lack of vitamin C in the diet might cause rheumatic fever, the vitamin is neither a cure nor a preventive of the disease and apparently has nothing to do with its cause.

First tests of the recent theory on human patients, with the above conclusions, were reported by Drs. Mark P. Schultz, Jules Sendroy and Homer F. Swift of the Rockefeller Institute for Medical Research at the meeting of the American Society for Clinical Investigation.

Their studies were made on over one hundred persons. Fifteen were patients acutely ill with rheumatic fever. These were given large daily doses of the vitamin in the form of ascorbic acid by mouth and by injection into the veins and in addition large doses of orange juice. They were also given substances rich in other vitamins. No beneficial effect of this treatment was seen.

Two groups of children, about thirty in each, were examined carefully for several months beginning in mid-winter. Children in one of the groups were given large daily doses of vitamin C in the form of ascorbic acid. Although the children not receiving the vitamin developed a mild degree of scurvy in early spring, there was no difference between the groups as far as the rheumatic disease was concerned. In fact, relapses of acute rheumatic fever occurred in three children who had received the ascorbic acid daily for two to three months.

Careful tests of the use and storage of vitamin C in thirty patients and non-rheumatic persons showed in the rheumatic patients no abnormality in the way the vitamin was handled by the body nor any deficiency in the body's store of this vitamin.

The theory that lack of vitamin C and consequent development of scurvy was a factor in causing rheumatic disease was based on experiments reported by Drs. James F. Rinehart and S. R. Mettier of San Francisco two years ago. These scientists produced symptoms resembling human rheumatic disease in guinea pigs deprived of vitamin C until a mild degree of scurvy appeared. The animal experiments were repeated by the Rockefeller scientists with the same results, but their studies on human patients, reported recently, lead them to conclude that lack of the vitamin is not important in causing the disease.

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MEDICINE

Potency of Liver Depends Upon Three Substances

THE ABILITY of liver to keep pernicious anemia patients alive and well, so long as they keep on eating it or taking liver extract, does not depend on any single chemical substance contained in liver.

Experiments showing that the effectiveness of liver depends on a mixture of three active substances, two of which have been obtained in pure crystalline form, were presented by Drs. Cyrus H. Fiske, Y. Subbarow and Bernard M. Jacobson of Harvard Medical School at the meeting in Atlantic City, N. J., of the American Society for Clinical Investigation.

Almost ever since the discovery of the liver treatment for pernicious anemia, scientists have been trying to find the chemical substance in liver responsible for its effect on the disease. Although potent liver extracts are now available for pernicious anemia patients, if the active substance in liver could be identified, it might be made in the laboratory much as many other medicines are made, instead of having to be extracted, at considerable expense, from liver itself.

Three substances obtained from liver by chemical treatment and known to scientists as "fractions" have been found to have an effect on the blood-cell-forming organs of both patients and guinea pigs. But in the course of chemical purification of the "fractions," they lost their anemia-relieving potency. Two of these "fractions" have been obtained in crystalline form and the chemical composition of one of them determined. Separately these "fractions" have no effect on pernicious anemia patients, the Harvard scientists reported, but a mixture of all three of them is highly effective as a remedy for the disease.

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LOST IN THE JUNGLE

This model shows the public a beautiful Mayan temple which one lucky scientific expedition "ran into" and which the two explorers fortunately photographed and studied then and there. No expedition has ever again found these ruins guarded by tangled vines and bush. The model is the work of Shoichi Ichikawa of the American Museum of Natural History, under supervision of Dr. George C. Vaillant and Clarence L. Hay.

MEDICINE

Tendency to Rheumatism May Be Inherited, Physician Says

A TENDENCY to arthritis, or rheumatism, to call it by its old-fashioned, popular name, may be inherited, Dr. Ralph Pemberton of Philadelphia, told the American College of Physicians. Success in preventing the disease depends on recognizing this fact. Infection and various other factors are the immediate causes of the disease, bringing on the pain and crippling in persons who have inherited or been born with the tendency to arthritis.

Success in treatment of the disease is highly gratifying, Dr. Pemberton said, and suggests unmistakably the possibility of controlling it. At present, arthritis, because of its disabling effects, surpasses tuberculosis as an economic and sociologic burden. When interest in the problem is great enough both among laymen and physicians, and when facilities for caring for arthritis patients in institutions become adequate, control of the disease will be possible, Dr. Pemberton predicted.

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PHYSIOLOGY

Crossed Legs Give Test For Disease of Blood Vessels

YOUR HEART and your foot move to the same rhythm when you sit with your legs crossed. This natural, almost invisible, swing of the foot has suggested to a Baltimore physician a new test for disease of the blood vessels of the legs. A preliminary report of the new test, devised by Dr. Bertram M. Bernheim of Johns Hopkins Medical School, appeared in the *Journal of the American Medical Association* (March 23).

Dr. Bernheim attaches a short rod to the side of the shoe of the free leg. The pointed tip of this rod rests lightly against the revolving drum of an instrument that traces the swing of the leg. The less the swing, the more serious is the condition, according to his interpretation. The greater and more regular the swing, the better is the condition.

While Dr. Bernheim is not certain of the cause for this, he suspects that the calf muscles spread according to the amount of blood sent to them and then contract again in a rhythm.

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MEDICINE

Breathing Helium Brings Relief to Asthma Sufferers

HELIUM, light-weight gas that lifts airships, can bring relief to sufferers from asthma, painfully gasping for every breath of air, Dr. Alvin L. Barach, of New York City, reported to the American College of Physicians meeting in Philadelphia.

Inhaling a mixture of eighty per cent. helium and twenty per cent. oxygen brought immediate improvement and relief for the shortness of breath to patients who had not been helped by morphine and could not tolerate adrenalin, usual standby for relief of asthma.

The lightness of helium is what makes it effective, Dr. Barach explained. Helium weighs only one-third as much as ordinary air. Consequently the effort required to move the helium-oxygen mixture in and out of the lungs should be only one-third that required to breathe ordinary air, Dr. Barach reasoned.

Success in the treatment of asthma patients whose smaller air passages were narrowed and patients having obstructions in the larger airways proved this point. While the dramatic improvement he reported was in patients who had not suffered from asthma for very long, Dr. Barach said this treatment would also help cases of long-standing asthma in which fatigue of the respiratory muscles was a factor. The treatment does not prevent or completely relieve the acute paroxysms of asthma and is not intended to displace adrenalin. Its specific function is related to lessening the effort required for breathing, resting the tired breathing muscles and consequently helping them to recover their ability for normal functioning.

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PHYSIOLOGY

Maternal Instinct Aroused by Hormone

MATERNAL instinct is a matter of gland chemistry. It can be aroused in virgins by daily doses, injected under the skin, of a hormone known as prolactin, Drs. Oscar Riddle, Ernest L. Lahr and Robert W. Bates of the Carnegie Institution of Washington reported at the meeting of the American Physiological Society.

They showed fellow scientists moving pictures of young virgin rats that have been treated with prolactin. These virgins retrieve baby rats and care for them in nests as maternally as if they had borne the offspring themselves. On the same screen appeared normal virgin rats and virgins injected with other hormones. These animals pay no attention to the baby rats and make no effort to give them maternal care.

Prolactin, the hormone that arouses the fundamental maternal instinct, is produced by the powerful and important pituitary gland at the base of the brain. Besides arousing the maternal instinct, prolactin stimulates the production of milk in animals that nurse their young and of crop milk in pigeons.

Prolactin has another remarkable action. When injected into adults, it reduces the size of the male sex glands. The largest dose reduced these glands to about 8 per cent. of their original size, Dr. Riddle and associates reported. A

female sex hormone from the pituitary gland, on the other hand, increased the size of the male sex glands up to 65 per cent. above that of the normal adult size of these glands.

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ASTRONOMY

Rotation of Milky Way Shown For Faint Stars as Well

Study of 18,000 Intrinsically Faint Stars Shows These Dwarfs Take Part With Giants in Rotation

NEW PROOF of the rotation of the galaxy, the system of stars including the Milky Way and all those that we can see in the sky through most telescopes, was presented to the National Academy of Sciences by Drs. Piet van de Kamp and A. N. Vyssotsky, of the Leander McCormick Observatory of the University of Virginia.

Studying the motions across the sky of 18,000 intrinsically faint stars, they demonstrated for the first time that these "dwarf" stars are taking part in this rotation, as well as the bright "giants" with which previous studies of the kind have been mostly concerned.

The galaxy is a vast swarm of stars, arranged in the shape of a watch or a grindstone, with a diameter so great that light travelling 11,000,000 miles a minute takes something like a 100,000 years to cross it. The sun, with the earth and other planets, are part of this system, located some distance from the center.

From study of the brighter stars, most of which are giants, it has been found that the entire galaxy is turning around a center, which is in the direction of the constellation of the Scorpion, a prominent group in the summer evening sky to the south. However, the great majority of the stars nearest to us are dwarfs, and probably they predominate all through the Milky Way. For this reason, the new McCormick Observatory results are important because they show that the galactic rotation is not confined to a few groups of very bright stars but is a general feature of them all.

The researches of Drs. van de Kamp and Vyssotsky will necessitate a revision of the previously accepted ideas that stars of any apparent magnitude are, on the average, more distant if they are in the Milky Way than if outside it. It has been found that for stars of the tenth to twelfth magnitudes the average distances are greater for those 15 degrees either side of the Milky Way than for those of similar brightness in it. This, it is suggested, is due to the presence of dark obscuring dust clouds in the Milky Way's plane, the presence of which have been indicated by numerous other pieces of work. Such clouds would hide the more distant stars in that direction.

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PHYSICS

New Musical Instrument Played by Light Flashes

A NEW electrical musical instrument called the "Photona" recently went on the air over Station WCAU in Philadelphia. Played with a two-bank piano keyboard, the apparatus produces notes of the musical scale through the loudspeakers by using standardized frequency impulses of light striking a collection of photoelectric cells.

Inside the apparatus is a series of revolving disks with slots cut radially. They are driven in synchronization by a common belt and pulley drive. Each disk (and there are twelve of them) rotates before a metal screen behind which are an intricate group of electric lights which can shine through small holes in the screen. Finally, in line with the illuminated holes and rotating disks, are twelve photoelectric cells.

In operation, the disks rotate continuously and as the musician presses a given key the light corresponding to it shines through its particular hole. Because of the slots in the disks the light flickers with a given frequency on the photo cell. If the flicker is 256 times a second the photocell receives 256 light impulses a second and turns them into 256 electrical impulses each second in the amplifying circuit. And from the loud speakers issues a note with 256 vibrations a second, or middle C of the musical scale.

The "photona" which has a range of six octaves requires 900 six-volt lamps and a maze of wires for the operation of each one. Its tone is said to be different from any other musical instrument.

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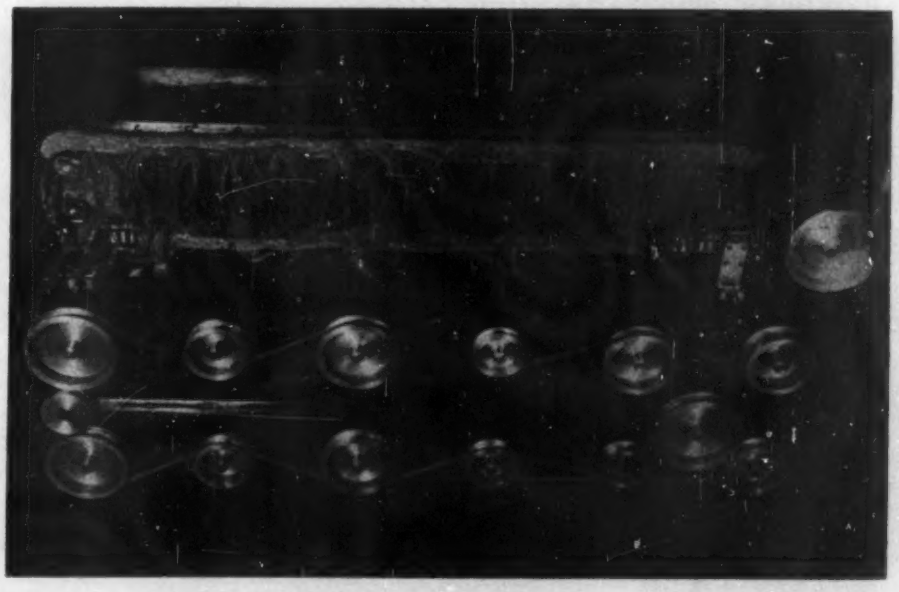
The smallest of cattle is the anoa, and the largest is the Indian bison or gaur.

At least one of every five lightning strokes is not a single flash but a rapid succession of strokes.



ELECTRICIAN'S NIGHTMARE

This rear view of the Photona exposes its complicated maze of wiring, controlling the 900 lights and numerous rotating disks that combine with photoelectric cells to produce a modern kind of music.

PSYCHOLOGY

Criminals Are Aggressive Because They're "Sissies"

CRIMINALS, "in an astonishingly larger number of cases, act aggressively because they are, in the slang phrase, "sissies." Their aggressiveness is a reaction against themselves, an effort to overcome their own feeling of insecurity and their secret tendency to effeminacy.

This conclusion was reached by Drs. Sylvan Keiser and Paul Schilder of Bellevue Hospital, New York City, after a psychological study of criminals in the prison ward of the psychiatric division of Bellevue Hospital. The psychiatrists reported their study to the American Psychiatric Association recently.

Their information was obtained from a questionnaire concerning the problem of aggressiveness given to fifty male prisoners. Some of the 36 questions were as follows:

What is courage? Should one fight with a stronger man? How would you defend yourself against a stronger man? Are you a success?

From the answers to the questions and other evidence presented the psychiatrists believe that "aggressive behavior in many criminals is an attempt to overcome those features considered feminine; and that in order to overcome latent homosexuality they assume what is commonly accepted as the attribute of virile masculinity."

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PHYSICS

No Need Now to Carry Liquid Oxygen in Rockets

A NEW method for the propulsion of rockets in stratospheric flight has been developed at Clark University by Dr. Albert C. Erickson, working under the direction of Prof. Robert Goddard, long known for his contributions to the science of rocketry.

The new development, it is believed, will relieve inventors of putting liquid oxygen in their rockets so that the fuel can burn. The system is intended for rockets in stratosphere flights when the air density may be low; but not for interplanetary flights as some of the more ambitious rocket enthusiasts plan. In interplanetary space there is no air and hence oxygen must be carried.

When applied to rocket propulsion, Dr. Erickson's system works by the repulsion of exhaust gases after the fashion of the motion of a skyrocket which gets its "kick" from its stream of fire.

Unlike previous systems, however, the new development does not release the exhaust flames in a continuous stream but only intermittently. And the nose of the rocket is open to catch a stream of stratospheric air.

Explaining the operation of the system in the *Journal of Aeronautical Sciences*, Dr. Erickson indicates the incoming air through the nose is compressed as it enters, by the high speed of the rocket. The temperature of the air rises (like the air in a bicycle pump under pressure) and it mixes with fuel issuing from the reservoir aboard the rocket. The exhaust gas from the combustion passes out the back end of the rocket through openings in a rotating disk so that jets of flame shoot out at intervals which, in practice, are as rapid as 600 a second. During each interval, as the holes are closed, more incoming air and fuel combine to create a new explosion.

Dr. Erickson has proved by experiment that such intermittent discharges are more effective in propulsion than is the continuous type previously used.

The system overcomes the obvious problem of how to get sufficient air at the low densities and pressures encountered high in the stratosphere by acting as its own "supercharger." Air pressure, of course, decreases with altitude and above 20,000 feet it is necessary to compress the rarefied gas to densities sufficient to burn the fuel.

The saving factor for Dr. Erickson's system of intermittent exhaust propulsion is that air pressure increases enormously with speed, as the designers of streamlined automobiles and airplanes are well aware.

If the air speed doubles, for example, the air resistance and pressure increases four times or more.

Science News Letter, May 18, 1935

PHYSICS

New Methods For Making Heavy Water Are Perfected

See Front Cover

NEW and low cost methods of manufacturing heavy water have been perfected at Pennsylvania State College.

In the illustration on the front cover of this week's SCIENCE NEWS LETTER, Prof. Harold C. Urey, Columbia University chemist, who received the Nobel Prize for discovering deuterium or double weight hydrogen, is shown inspecting the new apparatus.

Science News Letter, May 18, 1935

IN SCIE

BOTANY

Ancient Indians Wanted Color, Not Taste, in Corn

COLOR, rather than sweetness of "roastin' ears," was prized by American Indians in olden times, Dr. A. T. Erwin of the Iowa Agricultural Experiment Station, believes.

Among all collections of prehistoric corn in museums, Dr. Erwin finds only one undoubted example of true sweet corn. But the ancient color scheme of corn is varied, including blue, red, and yellow grains.

Modern natives of Mexico, land thought to be the "cradle" of corn, raise many types of corn, but not one specimen of sweet corn was detected by Dr. Erwin in an investigation there.

Sweet corn is thought to have been cultivated in the United States in the first half of the 19th century. It is apparently an offshoot of field corn, whose accidentally sweet grains the Indians did not trouble to propagate. Only the white man noticed the delicate difference.

Science News Letter, May 18, 1935

MEDICINE

"Bacteriophage" Saves Blood-Poisoning Victims

A LIFE-saving method of treating blood-poisoning cases by injecting "bacteriophage" prepared from the patient's own blood will soon be announced through the American Association of Pathologists and Bacteriologists.

This use of "bacteriophage," or the "germ-eater" as it is popularly known, was developed by Drs. Ward J. MacNeal and Frances C. Frisbie of New York City. Twenty-five out of one hundred patients suffering from blood-poisoning were saved by this treatment, the local physicians report. All of the cases had been considered hopeless when the "bacteriophage" was given.

Drs. MacNeal and Frisbie are using a new technic in the "bacteriophage" treatment, giving much larger doses than they formerly dared to use. They find the larger doses to be safe and more efficient.

Science News Letter, May 18, 1935

FIELDS

PHYSIOLOGY

Interrupted Loud Sound Is Greater Strain on Ear

A LOUD high-pitched sound produces more ear strain and a greater loss of hearing if it is interrupted every second instead of being continuous, Dr. Elmer Culler and Glen Finch reported to the Midwestern Psychological Association.

Thus the well known engineering rule that oscillating stresses are more destructive than a dead load of the same magnitude is found to hold for the cochlea of the ear just as it does for a bridge.

Long exposure to a note of 1,000 cycles frequency, which is near the upper limit reached by the soprano voice, will be followed by a loss of hearing for notes of all frequencies down even lower than middle C at 256 vibrations a second.

When a sound at the upper limit of the musical scale, 4,000 cycles in frequency, was continued over ten hours, the loss of hearing increased from a 55 decibel loss for sounds at 125 cycles to 104 decibels at 4,000 cycles. A noise of 55 decibels corresponds to the sounds of an average city street, while a 104 decibel sound is equivalent to the noise in a boiler shop.

Science News Letter, May 18, 1935

ANIMAL PSYCHOLOGY

Canaries Learn to Sing Without Any "Teaching"

THE beautiful and varied song of the roller canary can be developed by the young bird who has never been "trained" by an adult male songster. The generally accepted idea that young birds must be taught to sing by listening to the notes of a singer is proved false by an experiment just completed in the psychology laboratory of the University of Southern California, by Dr. Milton Metfessel, (*Science*, May 11).

Twelve young roller canaries were hatched and raised in soundproof cages completely isolated from the song of any other bird except the unmusical modest chirps of the mother. Six of the eight males heard no rolls or tours of any kind until they produced them themselves. Two heard only the song of the other isolated young birds as they developed adult song.

Students of bird song know that the song of the roller is a complicated one with many varied musical effects. The basic song consists of a sequence of effects known as hollow roll, hollow bell, schockel, flutes and water roll. These are added to or embellished by individual birds by the following effects: the bass roll, glucke, glucke roll, water glucke, schockel, deep bubbling water tour, bell roll, bell tour and bell glucke.

Experts say that the number of effects in the repertoire of any single bird generally varies from five to ten. It is very rare indeed that any single bird has all the effects in his song.

Four of the isolated birds had from four to six effects when breaking from their baby song into the mature roller song for the first time. The baby song is described as a nonsense melody of choppy notes covering a wide pitch range. All of the effects of the roller song were represented in the song of one or another of the isolated birds.

Science News Letter, May 18, 1935

GASTRONOMY

Salt Spoils the Food More Often Than Pepper

BELIEVE it or not, but you probably object more to an over-amount of salt than pepper in your food.

More than 1,000 Department of Commerce employees who have been buying fish "specials" in the new building's cafeteria are responsible for that conclusion, reached by W. T. Conn, Bureau of Fisheries technologist.

Recipes for the low-priced fish dishes they have been eating have been prepared by the Bureau of Fisheries laboratory in the basement of the building. Here a group of technicians aim to discover more and better fish recipes for the housewife.

Cafeteria patrons received questionnaires with their fish purchases, in which they were asked how they liked the dish, what was wrong with it, and so forth. By a response of two to one, more objected to excesses or shortages in salting than did to wrong peppering.

Another fact uncovered by Mr. Conn is that the greatest fish eaters per capita in the United States are not Catholics but Jews. Catholics eat less fish, despite its presence on their Friday menus, than do Jews or Protestants.

Science News Letter, May 18, 1935

MEDICINE

The Virus of Influenza Identified by Serum Tests

SERUM tests that identify "quite definitely" the virus causing human influenza and show the same virus is the cause of the disease in different parts of the world were reported by Drs. Thomas Francis, Jr., and T. P. Magill of the Rockefeller Institute for Medical Research, to the American Society for Clinical Investigation.

The virus was obtained from throats of influenza patients in Puerto Rico, New York and Philadelphia. The virus can be transmitted to both ferrets and mice, and in both species of animals causes consolidation of the lungs. Most of the mice die of the disease, but the ferrets usually recover.

The blood serum of ferrets that have recovered can check the ability of the virus to infect mice and to produce the lung consolidation. So does the blood serum of convalescent influenza patients, but the serum taken from patients during their acute illness does not protect the mice against the disease. This latter finding, Drs. Francis and Magill state, seems to "show quite definitely that the virus is the causative agent of the human disease."

Science News Letter, May 18, 1935

MARINE ZOOLOGY

Tiny Coral-Housed Crabs Collected for Smithsonian

SPECIMENS of a tiny crab, only a quarter-inch across, that forces growing coral animals to build a house for it, have been brought back to the Smithsonian Institution by Dr. Waldo L. Schmitt, who has recently returned from an expedition along the northwestern coast of South America and to the Galapagos Islands. The gall-crab, as it is called, was known in the western Pacific, but had never been found east of the Hawaiian Islands before.

When very young, the crab attaches itself to the end of a coral branch, just as it is starting to branch again. The presence of the crab probably acts as an irritation to the coral, increasing its rate of growth. At the same time currents are set up in water which determine the direction of this growth. The result is that the two branches fold over and come together, completely surrounding the crab in a limestone cell.

Science News Letter, May 18, 1935

CARTOGRAPHY

Making Mountains for Uncle Sam

Relief Workers From Many Fields Combine Talents To Reproduce National Parks in Perfect Relief Maps

By DR. ANSEL FRANKLIN HALL

Chief, Field Division of Education, National Park Service

WHEN you visit your favorite National Parks this summer you may see, in their museums, some fine new relief maps, that will give you the benefit of an airplane view—an advance summary, at a glance, of the wonders you will behold in detail as you drive along the roads between giant trees, or stand breathless on the brink of a tremendous canyon.

For these you may thank our too-well-known acquaintance, Old Man Depression. For by drafting a lot of highly skilled and enthusiastic workers into the Army of the Unemployed, he put a store of training and knowledge at the disposal of the U. S. National Park Service that we could never have got in any other way. These men got at least subsistence, plus a chance to keep their various skills from getting rusty; you got the maps.

It all happened because the government wanted to find jobs for a certain number of C.C.C. and C.W.A. workers. Could the Field Division of Education use them?

Frankly, I wasn't too enthusiastic. If the personnel of our staff had been larger, I wouldn't have been enthusiastic at all. But we needed help, and here was our chance to get it.

With resignation that rapidly changed to astonishment and thanksgiving, we went through the file of applications from the local jobless.

I don't know what we expected. Certainly not what we got. Engineers, draftsmen, molders, sculptors, architects, artists, trained librarians, photographers, historians, book reviewers, newspaper men, advertising men, radio technicians, school-teachers.

We had 52 people working under the C.W.A. Of these at least eight were Ph.D.'s and at least eight more were candidates for Ph.D.'s. Over 75 per cent. of the men were university graduates; several were graduates of schools of arts and crafts. Twelve or fifteen were women.

In addition to the 52 C.W.A. workers we had six enlisted men between the ages of 18 and 21, from the local C.C.C. camp.

How did these intelligent, specially trained professional men and women feel about working for a laborer's wage? That, too, was a surprise. They liked it.

This is not by way of saying that they rejoiced at the change from $3,000 or $5,000, and in some instances more per year, to the C.W.A. scale ranging from 45 cents to $1.10 an hour. But many of these people had been out of work a long time. And many of them had never had the opportunity to do work they really liked.

In our shops, our laboratories and studios, each person did something he enjoyed. There was no commercialism, no rush, no competition. The job was the thing. Each one could take the time he needed to do his best work. Each one was encouraged to suggest new methods that made for better results.

The work was first carefully planned by our Museum Headquarters staff. Models of certain prehistoric animals, the 50,000,000 year-old bones of which are found at Petrified Forest, were needed for the museum there. Grand Canyon National Park wanted miniature models of pueblo and pit house dwellings found in the Grand Canyon region of Arizona. A series of pen-and-ink drawings to illustrate the history of the fur trade at Scotts Bluff. A relief model of Sequoia National Park . . .

The two buildings that house the shops devoted to map making were loaned by the University of California. There was no janitor. After the day's work was over everybody had to help clean up. This was usually complicated by certain enthusiastic ones unwilling to quit when the whistle blew. Believe it or not, it was harder to get them home when the work is supposed to be over at night, than back on the job in the morning. When I went down to the office on Sunday, I occasionally looked in at the studio and almost always found several —usually more than half—of the men at work. Why? Well, just because they liked it, and were accomplishing something.

The United States Geological Survey makes the so-called "contour" maps which furnish the data for our models. In these maps each 100-foot level is represented by a wandering brown line, following exactly the route that would be taken by a "side-hill gouger" on his course around a hill, if he could neither increase nor decrease his elevation.

PLACING THE CONTOURS

This phase of "mountain making" is being handled by an experienced civil engineer.

Those squirming contours, all taken together, have a most confusing effect on the novice, but to the engineer, the Boy Scout, or anyone else trained in map reading, they present a key to the actual appearance of the country.

Where those brown contour lines occur far apart they indicate a gentle slope, when close, a steep declivity, and when they touch, as they sometimes do in the western mountains, that's the "jumping off place."

The process of making the model is essentially the reverse of that by which the map was made.

Starting with the map, the model builder enlarges it to the desired scale—say four inches to the mile, as is the case in the one we are now making of Sequoia—an eight times enlargement.

The old style was to greatly exaggerate vertical height. We now keep as near the actual proportions as possible. Having decided on the scale, we find a thickness of cardboard that would represent 100 feet in height. Then we trace and cut the contours from the cardboard. These layers, piled one above the other, thus rebuild the country in miniature.

These large-scale maps of the national parks are invaluable in orienting the visitor. He sees the entire area as an aviator would see it, he finds his landmarks, traces his own progress in exploring its wonders.

To be of real value a model must usually be large. Not too large, of course, but big enough to show all the intricate details of the topography. Normally they may be as long as ten or twelve feet. But the Sequoia model is 18 feet square. Sounds impractical, but it isn't. It is built in 3-foot squares, sections that will fit slide-like drawers in a cabinet. Any four or six or eight can be fitted together on a long table, to give the section one wishes to examine closely.

There are eight steps in the making of such a map.

First lantern slides are made, in negative, from the original contour map. There are 36 of them for the Sequoia model. These were made by a C.C.C. boy who showed considerable aptitude in photography and who has been given special training so that he is now capable of doing any of our darkroom work.

Then the slide is projected onto cardboard of the thickness decided upon by careful calculation. The projection lantern must be moved back and forth until the image exactly covers a sheet of cardboard three feet square.

Then the map with its myriad little contour lines is carefully traced. This is a strange sight, for the lantern shines upon the tracer as well as the cardboard, decorating him with rivers, mountains, lakes. He has to stand always a little to one side of his work. Each contour line has to be traced on a fresh sheet of cardboard, full size.

Fascinating, but tedious, this work is now being handled by an electrical engineer and an architectural draftsman, both university graduates of several years technical experience.

Next comes the work of cutting out the traced contour lines. Two C.C.C. boys and a C.W.A. worker who was formerly a piano tuner and finisher did this. A little machine called a "cutawl" is used. It works on the same principle as a sewing machine, a minute chisel vibrating up and down with great rapidity. It is a vast improvement over the old, slower, dusty, motor-driven jigsaw method.

Much skill is necessary to keep the little needle accurately following a line, where a mistake of an eighth of an inch would make an error of 132 feet on the model represented. But our men don't make mistakes. They know that absolute accuracy is essential.

Perhaps the most tedious work of all is the pasting of these various cut-out contours, one upon the other. A professor of civil engineering and a consulting civil engineer have it in charge. Under their skillful hands plateaus and mountains rise as if by magic. They know the names of every tiny river, every little peak as these take form under their hands.

At one time we used very small nails to fasten these successive layers of cardboard together, but we had to improve on this method for we found that nails compressed the cardboard, and caused distortion. Now a waterproof glue made with silicate of soda is used, and the pieces are pressed into place.

Constant watch must be kept for error. If the cutter's hand has wavered, and one contour juts out over another as little as 1/32 of an inch, it must be patiently adjusted. Sometimes the glue slides ever so slightly in drying, carrying the cardboard contours out of place. Then they must be pried loose, carefully replaced in the proper spot.

When the work of assembling and pasting of one three-foot-square section is completed, it is fitted to the map as a whole. A flat section will be thinner than a mountainous section. Hence they are not all the same, and must be carefully built up with wood until all fit perfectly into place. Fortunately there was a professional cabinet maker available for this job.

Now comes the finer modeling and minute details of sculpture at the hands of one draftsman, one graduate architect, one National Park ranger, and two C.C.C. boys.

To remove the appearance of "steps" which is left when the pasting is finished, it is necessary to cover the cardboard with a thin, even layer of modeling clay. Then delicate details are finished by hand modeling, and when this is finished the entire surface is gone over with a dilute mixture of clay and water and finer tools, to give a forest finish. Mountain tops are left stark and bare.

And now it is the caster's turn. This plaster caster is the only man of the entire staff who is doing the work he is accustomed to. For years our caster has been making plaster casts. Speed was the watchword of his lifetime. If he weren't so good-natured he would have gone mad, waiting to snatch the model from someone's reluctant hands.

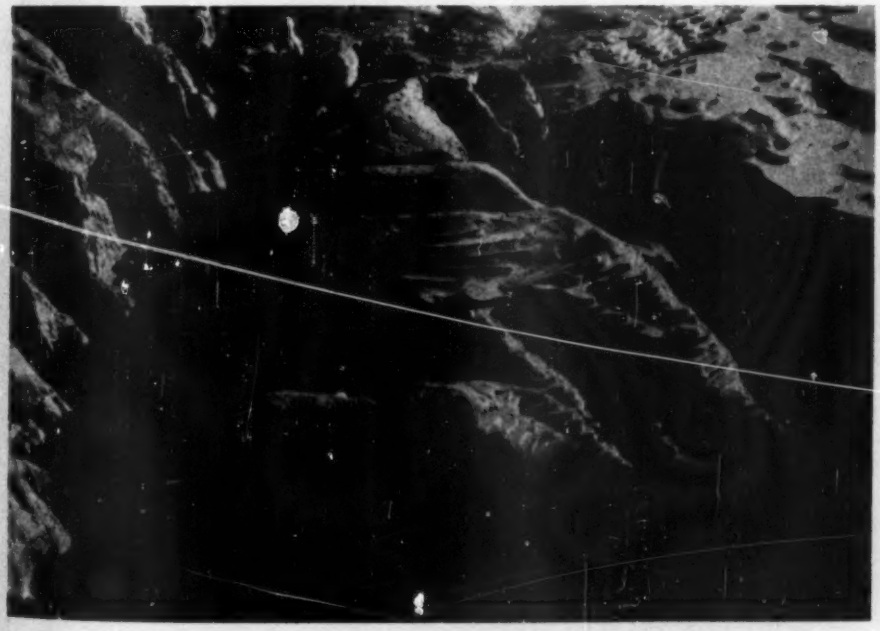
"That's finished, isn't it!—Here, I'll take it—"

"Mm . . . wait a minute. I want to look at this lake again. I want to ease it off, just a little—"

Our poor "Tony!"

But he's got used to it now. He, too, begins to enjoy sufficient time to make a perfect job.

The casting is done just outside the building. First the model is shellaced. When the shellac is dry the wet plaster is applied and the mold is made. This



ZION CANYON IN THE MAKING

The finished portion at the left represents the deep chasm known as "The Narrows"; the portion at the right shows the steps between the contours which will later be filled with prepared modeling clay.

mold is the "negative"—just the opposite from the original model; ridges are valleys and valleys ridges. But when the casts are made from the mold, they, like the original, are "positive."

Each piece weighs between 25 and 150 pounds, depending upon whether the section is level or mountainous.

Then the cast is sent over to our studio department where the artists take it in hand and try to make an exact reproduction of nature as it would appear from an airplane flying at the height of several miles.

Work such as we have been doing in our laboratories has an actual money value of thousands and thousands of dollars—far more, in fact, than the Government put into the work. It has permanent value, for each model of this sort will be placed in one of the national park museums where it will interpret the story of the park to the many thousands of American citizens who will see it each year and whose vacations will be made the more enjoyable by a thorough understanding of what they see.

Science News Letter, May 18, 1935

FINISHING MESA VERDE

Mesa Verde National Park occupies the top of a plateau in southeastern Colorado.

PHYSIOLOGY

Nicotine Affects Nerve-Ends In Muscles, Not the Brain

A PERSON poisoned by nicotine stops breathing because the nerve endings in the muscles of his breathing apparatus are paralyzed. The drug does not paralyze the breathing center in the brain, as has been generally believed.

These discoveries, which suggest a new method of treating nicotine poisoning, were reported by Drs. Harry Gold and Frederick Brown of Cornell University Medical College, New York, at the meeting in Detroit of the American Society for Pharmacology and Experimental Therapeutics.

Artificial respiration, rather than drugs to stimulate the breathing center in the brain, is the method suggested by the Cornell investigators for treating cases of nicotine poisoning in which breathing has been dangerously slowed or stopped altogether. Stimulating drugs can only make matters worse in such cases, they pointed out, because the partially paralyzed nerve endings require rest, such as can be obtained by artificial respiration. A substance like barbital, which has a depressing rather than stimulating effect on the nerves, can abolish the convulsant action of nicotine, they found. An animal treated with this substance can survive an otherwise fatal dose of nicotine.

The new knowledge of how nicotine acts to stop breathing was obtained in several ways. First, direct application of the drug to the respiratory center in the brain caused marked stimulation of breathing, the Cornell investigators found, but even very large doses of nicotine applied to the brain center failed to cause paralysis of breathing.

Secondly, nicotine was found to be more poisonous when injected into a vein than when injected into the carotid artery, the principal artery of the neck. If the action of nicotine was directly on the respiratory center, the reverse should have occurred, for when the drug is injected into the carotid artery it goes directly to the brain without passing through the lungs. When injected into the veins it goes to the lungs first. This, therefore, indicates that the seat of the toxic action is not the brain respiratory center.

Thirdly, it was found that after nicotine the power of the nerve endings to carry impulses from the brain center to the muscles was markedly reduced or abolished. Significant evidence was also obtained by means of a special device by which the minute electrical potentials produced in the brain were enlarged through radio tube amplifiers and recorded with the string galvanometer. When all signs of breathing had ceased after nicotine, the cells of the breathing center in the brain were still continuing to send down volleys of electrical discharges in a normal manner, showing conclusively that the nicotine did not injure the breathing center.

Science News Letter, May 18, 1935

Clipping shrubbery to resemble animals, ships and other curious shapes was a garden custom popular with the ancient Romans.

RADIO

Tuesday, May 21, 3:30 p. m., E.S.T.

THE MOSAIC OF NATURE, by Dr. George J. Peirce, Professor of Botany, Stanford University.

Tuesday, May 28, 3:30 p. m., E.S.T.

FOODS WE EAT AND WHY WE EAT THEM, by Prof. R. Adams Dutcher, Department of Agricultural and Biological Chemistry, Pennsylvania State College.

In the Science Service series of radio addresses given by eminent scientists over the Columbia Broadcasting System.

BOTANY

NATURE RAMBLINGS
by Frank Thone

Warm Lands Are Vine Lands

VINES are most abundant in the woods in the lower latitudes.

In the Arctic, as on the high mountain-tops, there are no vines at all, or as good as none. The last straggling firs that mark the limit of timber, both in latitude and altitude, have no dependents looking to them for support.

As you come down into the temperate regions, vines begin to appear, at first few in species and sparing in total abundance, growing gradually thicker and more varied botanically as you get into warmer and moister regions.

It is when you get into the tropics, however, that vines develop in all their twining glory. There they reach their widest botanical development, with representatives not only of what we commonly think of as vine families, like trumpet-creepers and ivies, but also of plant groups that seem decidedly queer to find as vines: bamboos, palms, ferns, milkweeds, figs.

In the densest tropical jungles there are very few undergrowth shrubs; not enough sunlight can get down through the thick tree-tops to nourish them. But the vines are even more numerous than the trees—it is hard to guess, frequently, whether a given piece of forest supports more of its own leaves or of vine leaves, at the tops of its massive trunks. Vines are the traveler's chief trouble in the virgin jungle, if he strays away from the clearings.

Their stems are often massive, thick as fair-sized tree trunks of a temperate-zone forest. Even in the warmer lands outside the tropics this is the case. In the hardwood "hammocks" of northern Florida, for example, it is nothing uncommon to find poison-ivy vines with stems six or eight inches in diameter.

Science News Letter, May 18, 1935

POPULATION

Poverty Reduces Birthrate But Poor Have Large Families

POVERTY is not a cause of large families, but has the opposite effect of reducing the birthrate. The popular misconception that poverty is the reason why relief families have a higher birthrate than those not on relief, was thus blown up by a report of Drs. Frank W. Notestein and Clyde V. Kiser, of the Milbank Memorial Fund, speaking before the Population Association of America in Washington, D. C.

Surveys made by the U. S. Public Health Service and the Milbank Memorial Fund reveal the birthrate is much higher among those on relief, but that does not mean the birthrate of this group rose during the depression. On the contrary, it fell as did the birthrate of all other groups.

Birth control methods are only one factor tending to reduce the live birthrates, especially among the better classes. Another factor is abortion, including unavoidable miscarriages. One abortion to every two and a half confinements in cities, and one to five confinements in country districts, is the startling estimate cited by Drs. Notestein and Kiser.

A survey of 10,000 clinic patients in New York City showed 15 per cent. of the pregnancies were terminated by criminal abortion during the first five years of marriage. After 10 years of married life, the abortion rate had increased to more than 40 per cent.

Differences in birth control practices are held responsible, by these scientists, as more important than any other factor in making the fertility greater for the lower social groups.

Depressions were pictured as a social sieve for sorting out those most in need of aid for physical as well as economic survival by Dr. G. St. J. Perrott, of the U. S. Public Health Service, in a report to the same meeting.

The larger proportion of those hardest hit by bad times are unskilled workers with little education. They have much more tendency toward illness in the family, a higher deathrate and a higher birthrate than those who have weathered the economic storm.

These facts were revealed by a survey of white wage-earning families in 81 large cities made by the U. S. Public Health Service in cooperation with the Milbank Memorial Fund.

One out of every five of the families studied was receiving public or private relief. About half of those with family incomes under $1,200 were on relief.

For people in comfortable circumstances in both 1929 and 1932, the illnesses occurring during the three months just before the survey amounted to 119 per thousand. For the chronic poor, the rate was higher, 153 per thousand. But those suffering most from illness were the newly poor, people who were comfortably well off in 1929 but who were poor in the days of the depression. The rate for them was 185 per thousand, more than half as large again as the illness rate of those who remained in good economic condition.

Probably the change in income, with its crowding into smaller quarters and lack of proper food, clothing and medical care, was responsible for much of the illness in this newly-poor group. But other figures lead Dr. Perrott to believe that there is another side to the picture. It may be that loss of income and loss of jobs naturally come more often to those who have also a tendency to sickness in their families.

Science News Letter, May 18, 1935

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MARINE ENGINEERING

Two-Ton Diving Ball For Use In Deep Sea Salvage Tested

Able to Withstand Pressures 2,500 Feet Under Sea, Ball Has External Arms Which Can Even Tie Knots

A TWO-TON diving ball, commercial counterpart of the Beebe-Barton bathysphere, has arrived in Washington to show officials, both Federal and foreign, the newest methods of undersea salvage.

Already tested at depths greater than 800 feet, the five-foot steel sphere has been officially called by Navy inspectors "the greatest invention since the diving suit."

For the next month the diving ball will be aboard the "Constellation," four-masted sailing ship now anchored at Washington's waterfront.

Developed by the Romano Salvage Corporation of Seattle, Wash., the diving ball holds the following records of accomplishment: Steel railroad gondola car raised 485 feet from the bottom of Puget Sound in five and one-half hours. Raised, as a test, a tug weighing 220 tons from a 310 foot bottom. Descended to 852 feet to test undersea lights and operation.

Designed primarily for work below the range of ordinary diving suits at 300 feet, the new device is intended for use in deep-sea salvage operations, for rapid raising of sunken submarines and for sponge fisheries. More romantic, but of less immediate interest, is the raising of some part of the $2,000,000,000 in gold known to lie at the bottom of the seven seas in ships which sank at intervals from the days of the Spanish Main to the World War.

The Romano diving ball is made of steel sufficiently strong to stand pressures 2,500 feet below the surface of the sea. It owes its usefulness to a variety of arms operated from within. Twelve different "gadgets" can be attached to these moving arms six feet long. With them the operator can lift objects weighing 1,000 pounds, tie knots in one and one-half inch steel cable, drill holes up to three inches in diameter through ships' plates and perform a variety of other tasks which a diver needs to do beneath the water.

Operated hydro-pneumatically, the arms can lift great weights and yet are so delicate in their movement that, as a test, a man within the ball has "made a fourth" at bridge, picking up and laying down his cards as needed.

Provided with an oxygen tank and an absorbing cell for carbon dioxide given off in respiration, the operator within the ball can work for twelve hours at a stretch, always under normal air pressure. When returning to the mother ship above there is no long delay to equalize air pressure and thus prevent the diver's menace—the "bends."

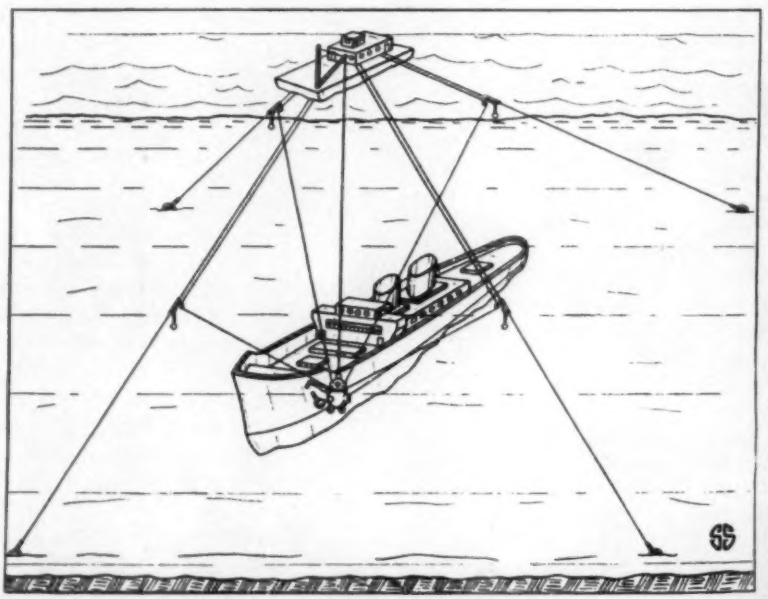
Telephone communication is provided with the ship on the surface through which the movements of the diving ball are accurately controlled.

In operation, four anchors with attached cables are sunk at the four corners of a given area, which may be 1,000 feet on a side. The four lines thus fixed meet overhead at the mother ship. From the underwater tent-like cable structure hangs the diving ball. From the mother ship the ball can be moved up, down and sideways over any part of the bottom under inspection.

For working in the inky blackness of the depths special electric lights are provided that illuminate the bottom for fifty feet around the ball.

The main function of the device is to attach cables to the sunken ships, down which great tanks, each capable of lifting 100 tons, can be sunk to the body of the wreck. Open at the bottom, these tanks are filled with water, and hence do not have to withstand the enormous hydrostatic pressures. When in place, over the wreck, air is pumped into them until they attain a positive upward buoyancy. At all times the pressures inside and outside are equal. It is only necessary to attach sufficient tanks to the wreck to lift more than its total weight. Once they are filled with compressed air from the surface, the wreck either comes up or tears itself apart.

An application of interest to the Navy is the raising of sunken submarines. As planned, each submarine would have, under its decks, small marking buoys with several hundred yards of cable. When it sinks to the bottom the crew within would release these marking buoys which would rise to the surface, carrying up the cable, and set off marking flares.



RAISING SHIPS FROM THE SEA

The dragline system by which the new diving ball salvage apparatus moves over a wide area under water. Four cables are fixed by anchors over a region of sea bottom and meet at the mother ship on the surface. Suspended from these four cables by four others is the diving ball whose vertical and horizontal motions are accurately regulated from the mother ship. Telephone communication instantly directs the location of "ball" which by drills and clamps affixes buoyant tanks to the submerged wreck. At one "station" of the mother ship two square miles of ocean bottom can be quickly "worked" by the ball.

COMMERCIAL "BATHYSPHERE"

The rescue ship simply slides the large buoyant tanks down these cables to the submarine and then pumps in air until the tanks raise the sub. Sufficiently strong eye-bolts in the body of the sub would be built into place at the time of construction and the whole raising operation, it is estimated, could be accomplished in a few hours.

For sponge fishing the Romano diving ball has interest because it can operate for long periods below the range of present divers in rubber suits. The world's supply of good sponges is reaching lower and lower depths all the time. Dragging operations, now used in some regions, are unsatisfactory since the sponges are torn in the process. Somewhat like flowers, sponges ought to be "picked" for best results.

Then in the background of usefulness are the treasure ships of the world which ever excite the imagination with the wealth potentially present. Lieut. Harry E. Rieseberg, commanding the sailing ship Constellation from which the Washington demonstrations will be held, is an authority on the location of such ships. His world charts show scores of them lying on the bottom at depths of only 400 or 500 feet. They are just below the range of present diving equipment but well within the operation limits of the new diving ball. Along the Spanish Main, through the Mediterranean Sea, and even in Inca-sailed lakes of South America are said to be fortunes in gold and silver awaiting the coming of man to bring them to the surface.

Science News Letter, May 18, 1935

GENERAL SCIENCE

Science Service Board Elects Three New Trustees

THREE new trustees of Science Service, the institution for the popularization of science, were elected at its recent annual meeting: Dr. Harlow Shapley, director of Harvard College Observatory, representing the National Academy of Sciences; Dr. Henry B. Ward, permanent secretary of the American Association for the Advancement of Science, representing that organization; Dr. Ludvig Hektoen, director of the John McCormick Institute for Infectious Diseases, representing the National Research Council.

Dr. Vernon Kellogg, secretary emeritus of the National Research Council, who retired as a trustee, was elected honorary vice-president in appreciation of his long service in the office of vice-president.

The following resolution was adopted upon the death of Dr. David White, formerly of the U. S. Geological Survey, who was a Science Service trustee.

RESOLVED, That the Board of Trustees of Science Service desire to express their sincere feeling of sorrow and personal loss in the death of Dr. David White. His long and valuable services as a Trustee, as a member of the Executive Committee and as Chairman of the Executive Committee are recognized and deeply appreciated by his fellow members as constituting an important factor in the successful initiation and development of the work of Science Service. It is ordered this resolution be entered upon the minutes of the meeting of April 25, 1935, and that a copy be sent to Mrs. White.

Trustees re-elected were: Dr. R. A. Millikan of the California Institute of Technology, representing the National Academy of Sciences; R. P. Scripps of the Scripps-Howard Newspapers, representing the E. W. Scripps Estate; Marlen Pew, editor of Editor and Publisher, representing the journalistic profession.

Dr. J. McKeen Cattell, editor of Science, was re-elected president. Other officers re-elected were: Dr. W. H. Howell of Johns Hopkins University, vice-president and chairman of the executive committee; H. L. Smithton of Scripps-Howard Newspapers, treasurer; and Watson Davis, director of Science Service, secretary. Dr. C. G. Abbot, secretary of the Smithsonian Institution, and Mr. Pew were re-elected members of the executive committee. Dr. William E. Ritter of the University of California is honorary president of Science Service.

Annual reports of Science Service for its fourteenth full year of operation ended March 31, showed that news and interpretations of scientific progress are furnished over 6,000,000 readers through newspapers utilizing Science Service news and feature reports, issued by telegraph and mail daily, weekly and monthly.

The weekly magazine of Science Service, the SCIENCE NEWS LETTER, gained distribution and currently has over 16,000 circulation.

Various books and magazine articles written and edited by members of the staff were produced during the year, notably the book, "The Advance of Science." Two radio talks each week were arranged by Science Service during the year over nationwide networks of stations.

Progress was made toward an extension of Science Service activities in the British Empire, and a working arrangement for the exchange of news with Tass Agency of the U. S. S. R. was made.

Research aid activities consisting of the collection of earthquake information, the distribution of cosmic data, and the investigation of archaeological and anthropological discoveries were continued.

The cost of operation of Science Service during the year was slightly over $110,000, about three-quarters of which was income derived from product.

Science Service was organized in 1921 as a non-profit corporation charged with the broad work of science popularization.

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First Glances at New Books

Physics

SCIENCE AND THE HUMAN TEMPERAMENT — Erwin Schrödinger — *W. W. Norton,* 216 p., $2.50. Discussion by the 1933 Nobel Prize winner of the backgrounds of the new quantum mechanics on which modern physics now rests its hopes of understanding the universe. Written for laymen, the book must, of necessity, concentrate on the philosophical aspects of quantum mechanics and discusses the age-old questions of determinism vs. indeterminism in nature, the laws of chance and causality. But, more and more philosophy enters into physics. Says Prof. Schrödinger, "The old links between philosophy and physical science, after having been temporarily frayed in many places, are being more closely renewed. The farther physical science progresses the less can it dispense with philosophical criticism. But at the same time philosophers are increasingly obliged to become intimately acquainted with the sphere of research, to which they undertake to prescribe the governing laws of knowledge."

Science News Letter, May 18, 1935

Mechanics

ELEMENTARY MECHANICS—Joseph B. Reynolds—*Prentice-Hall,* 336 p., $2.75. Revised edition of a college text.

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Chemistry

THE NEW WORLD OF CHEMISTRY—Bernard Jaffe—*Silver, Burdett,* 599 p., $1.80. An elementary chemistry textbook written by the chairman of the physical sciences department of one of New York's largest high schools. An attempt is made and succeeds in humanizing the science by weaving into the book part of the struggle which research chemists and physicists go through in creating chemistry as it is.

Science News Letter, May 18, 1935

Botany

POISONOUS PLANTS OF PENNSYLVANIA—Edward H. Graham—*Carnegie Museum, Pittsburgh, Pa.,* 15 p., 10c.

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Ethnology

RUSSIA: A NEW HISTORY—Ivar Spector—*Metropolitan Press,* 222 p., $2. The small size of this book is deceptive. It is no primer-history, but a compact volume for those interested in probing the forces of culture, race, and personality that have figured in Russia's story. The author states his conviction that there has been no text book on Russian history which adequately meets the needs of American college students, and for this type of student, the book was especially written.

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Ornithology

THE HAWKS OF NORTH AMERICA, THEIR FIELD IDENTIFICATION AND FEEDING HABITS—John B. May—*National Assn. of Audubon Societies,* 140 p., $1.25. Adequate accounts of the appearance, habits and range of American hawks, with helpful little distribution maps inserted in the text. There are dozens of beautiful full-page illustrations in color by Allan Brooks, and many pages more of careful recognition sketches in black-and-white by R. P. Peterson.

Science News Letter, May 18, 1935

Archaeology

PROGRESS IN ARCHAEOLOGY—Stanley Casson—*Whittlesey House,* 111 p., $2. A non-technical account of recent achievements by archaeologists throughout the world. With only nine pages to devote to America, and but eleven to give to the East from Iraq to India, the author adroitly manages to touch the high points of significant discovery, and also to summarize results. Most of the discoveries described date from the period since the War.

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Geology

LABORATORY MANUAL FOR GENERAL GEOLOGY (PHYSICAL AND HISTORICAL)—Mark Howard Secrist—*Macmillan,* 295 p., $1.75.

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Meteorology

THE CANADIAN CLIMATE — Clarence Eugene Koeppe — *McKnight & McKnight,* 280 p., $3.32. Anybody interested in weather in the United States must perforce be interested in Canadian weather; for it is in the great Dominion to our north that a great deal of our weather takes shape. A compact but decently complete book like this is therefore an excellent thing to have available.

Science News Letter, May 18, 1935

Zoology

THE VAMPIRE BAT, A PRESENTATION OF UNDESCRIBED HABITS AND REVIEW OF ITS HISTORY—Raymond L. Ditmars and Arthur M. Greenhall—*New York Zoological Soc.,* Zoologica, Vol. XIX, No. 2, p. 53—76, 30c plus postage. The ghoulish and quite imaginary accounts that have filled the world's "vampire" literature have given the actual, existing vampire bat a semi-legendary character also. This brief publication will therefore be welcomed by every one who really wishes to get a "straight story" on this interesting animal."

Science News Letter, May 18, 1935

Radio

THE BEGINNER'S STORY OF RADIO—B. Francis Dashiell—*Radex Press,* 96 p., 75c. A boy's book on electricity as applied to radio. Compact and bound in stiff paper, it shows the underlying principles plus many wiring diagrams of standard circuits.

Science News Letter, May 18, 1935

Natural History

AN ALMANAC FOR MODERNS—Donald Culross Peattie—*Putnam,* 396 p., $3. Each day is given its appropriate little essay, by a careful student of nature who also has some literary pretensions. The subjects range from Orion to bees and orchids, from biographical sketches of Thoreau and Lamarck to the lives of salmon and butterflies.

Science News Letter, May 18, 1935

Botany

A TEXTBOOK OF MYCOLOGY—Ernst A. Bessey—*Blakiston's,* 495 p., $4. General botanists as well as plant pathologists will welcome this new textbook. Most of the mycological literature has been either "pointed at" plant pathology or at field studies of the fleshy fungi. There has been a distinct need for a single-volume up-to-date work on the general biology of the fungi, with the treatment of various groups kept in proper balance. The bibliography of recognition-literature (73 pages!) is especially worthy of commendation.

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